CERTIFICATE OF COMPLIANCE

Certificate No.:	Date of Issue:
K132101.00	30 January 2014

Applicant Name:	RADWARE Ltd.
Applicant Address	22 Raul Wallenberg St., Tel-Aviv, 61131, Israel
Product	Network Switch Load Balancer
Model / Type Ref.	Alteon 6420 XL with Extreme SSL, P/N RODS-HTQ-XL-A4-A, With Single AC P.S., P/N PSS2-5A00V3V, Manufactured by Zippy Tech (See customer's declaration dated 30 January 2014 in ITL test report no. E132101.00 for additional P/N names).
Rating	100-240 VAC; 47-63 Hz
Tested to	FCC Part 15, Subpart B, Class A
Test Results are detailed in the Test Report No.	E132101.00

Name:

Signature: _____

Certification Dept.

This is to certify that the product specified herein has been tested & the test results were found to be compliant with the requirements noted above.

Bat-Sheva St. 1 P.O.B. 6117 Lod 7116002 Israel Tel: 972-8-9153100 Fax: 972-8-9153101 standard@itl.co.il | www.itl.co.il

CERTIFICATE OF COMPLIANCE

Certificate No.:	Date of Issue:
K121571.00	7 February 2013
Applicant Name:	RADWARE Ltd.
Applicant Address	22 Raul Wallenberg St., Tel-Aviv, 61131, Israel
Product	Network Application Switch
Model / Type Ref.	RODS-HTQ-D-2AC (See customer's declaration in ITL test report no. E121571.00 for additional model names).
Rating	100 - 240 VAC 50/60 Hz
Tested to	FCC Part 15 Subpart B, Class A
Test Results are detailed in the Test Report No.	E121571.00

Signature: _____

Certification Dept.

This is to certify that the product specified herein has been tested & the test results were found to be compliant with the requirements noted above.

Bat-Sheva St.1 POB 87, Lod 71100 Israel Tel. 972-8-9153100 Fax. 972-8-9153101 standard@itl.co.il I www.itl.co.il

CERTIFICATE OF COMPLIANCE

Certificate No.:	Date of Issue:
K132105.00	30 January 2014

Applicant Name:	RADWARE Ltd.
Applicant Address	22 Raul Wallenberg St., Tel-Aviv, 61131, Israel
Product	Network Switch Load Balancer
Model / Type Ref.	Alteon 6420 XL with Extreme SSL, P/N RODS-HTQ-XL-A4-D, With Single DC P.S., P/N DPSS2-5A00V3V, Manufactured by Zippy Tech (See customer's declaration dated 30 January 2014 in ITL test report no. E132105.00 for additional P/N names).
Rating	36-72 VDC
Tested to	FCC Part 15, Subpart B, Class A
Test Results are detailed in the Test Report No.	E132105.00

Name:

Signature: _____

Certification Dept.

This is to certify that the product specified herein has been tested & the test results were found to be compliant with the requirements noted above.

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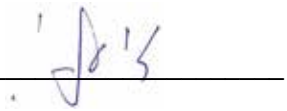
CERTIFICATE OF COMPLIANCE

Certificate No.:	Date of Issue:
K121575.00	7 February 2013
Applicant Name:	RADWARE Ltd.
Applicant Address	22 Raul Wallenberg St., Tel-Aviv, 61131, Israel
Product	Network Application Switch
Model / Type Ref.	RODS-HTQ-D-2DC (See customer's declaration in ITL test report no. E121575.00 for additional model names).
Rating	100 - 240 VAC 50/60 Hz
Tested to	FCC Part 15 Subpart B, Class A
Test Results are detailed in the Test Report No.	E121575.00

Signature: 

Certification Dept.

This is to certify that the product specified herein has been tested & the test results were found to be compliant with the requirements noted above.

Bat-Sheva St.1 POB 87, Lod 71100 Israel Tel. 972-8-9153100 Fax. 972-8-9153101 standard@itl.co.il I www.itl.co.il

MET Laboratories, Inc. ***Safety Certification - EMI - Telecom Environmental Simulation***
914 WEST PATAPSCO AVENUE • BALTIMORE, MARYLAND 21230 • PHONE (410) 354-3300 • FAX (410) 354-3313
33439 WESTERN AVENUE • UNION CITY, CALIFORNIA 94587 • PHONE (510) 489-6300 • FAX (510) 489-6372
3162 BELICK STREET • SANTA CLARA, CALIFORNIA 95054 • PHONE (408) 748-3585 • FAX (510) 489-6372
13301 MCCALLEN PASS • AUSTIN, TEXAS 78753 • PHONE (512) 287-2500 • FAX (512) 287-2513

Radware Ltd.
22 Raoul Wallenberg St
Tel Aviv, 69710, Israel

June 10, 2014

Dear Yaniv Ben-Dor

Enclosed is the EMC test report for compliance testing of the Radware Ltd., Alteon 6420p XL Dual DC NEBS with extreme SSL, tested to the requirements of Title 47 of the Code of Federal Regulations (CFR), Part 15 Subpart B for a Class B Digital Device.

Thank you for using the services of MET Laboratories, Inc. If you have any questions regarding these results or if MET can be of further service to you, please feel free to contact me.

Sincerely yours,
MET LABORATORIES, INC.

Laura M. Thomas
Documentation Department

Reference: (\Radware Ltd.\EMC37333-FCC Rev. 1)

ACCREDITED
#0591.01

MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*
914 WEST PATAPSCO AVENUE ● BALTIMORE, MARYLAND 21230-3432 ● PHONE (410) 354-3300 ● FAX (410) 354-3313
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Electromagnetic Compatibility
Test Report

For the

Radware Ltd.
Alteon 6420p XL Dual DC NEBS with extreme SSL

Tested under

Title 47 of the Code of Federal Regulations (CFR),
Part 15 Subpart B
for a Class B Digital Device

MET Report: EMC37333-FCC Rev. 1

June 10, 2014

Prepared For:

Radware Ltd.
22 Raoul Wallenberg St
Tel Aviv, 69710, Israel

Prepared By:
MET Laboratories, Inc.
914 W. Patapsco Ave.
Baltimore, MD 21230

Electromagnetic Compatibility
Test Report

For the

Radware Ltd.
Alteon 6420p XL Dual DC NEBS with extreme SSL

Tested under

Title 47 of the Code of Federal Regulations (CFR),
Part 15 Subpart B
for a Class B Digital Device

MET Report: EMC37333-FCC Rev. 1

Darrell Robinson
Project Engineer, Electromagnetic Compatibility Lab

Laura M. Thomas
Documentation Department

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the applicable limits. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested **is** capable of operation in accordance with the requirements of Title 47 of the CFR, Part 15, Subpart B for a Class B Digital Device under normal use and maintenance.

Asad Bajwa,
Director, Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
Ø	May 27, 2014	Initial Issue.
1	June 10, 2014	Made editorial changes.

Table of Contents

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List of Terms and Abbreviations

AC	**A**lternating **C**urrent
ACF	**A**ntenna **C**orrection **F**actor
ANSI	**A**merican **N**ational **S**tandards **I**nstitute
Cal	**Cal**ibration
d	**M**easurement **D**istance
dB	**D**eci **B**els
dBμV	**D**eci-**B**els above one **micro V**olt
dBμV/m	**D**eci-**B**els above one **micro V**olt **per m**eter
DC	**D**irect **C**urrent
DCF	**D**istance **C**orrection **F**actor
E	**E**lectric Field
EUT	**E**quipment **U**nder **T**est
f	**F**requency
FCC	**F**ederal **C**ommunications **C**ommission
GHz	**G**iga **H**ert**z**
Hz	**H**ert**z**
kHz	**k**ilo**h**ert**z**
kPa	**k**ilo**pa**scal
kV	**k**ilo **V**olt
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
MHz	**M**ega**H**ertz
μ**H**	**micro H**enry
μ**F**	**micro F**arad
μ**s**	**micro s**econds
RF	**R**adio **F**requency
RMS	**R**oot-**M**ean-**S**quare

1.0 Testing Summary

Title 47 of the CFR, Part 15, Subpart B, Reference and Test Description	Results	Comments
15.107 (a) Conducted Emission Limits for a Class B Digital Device	Not Applicable	The EUT is DC powered.
15.109 (a) Radiated Emission Limits for a Class B Digital Device	Compliant	Measured emissions were below applicable limits.

Table 1. Summary of Test Results

2.0 Equipment Configuration

2.1 Overview

MET Laboratories, Inc. was contracted by Radware Ltd. to perform testing on the Alteon 6420p XL Dual DC NEBS with extreme SSL, under Radware Ltd. purchase order number A2612.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Radware Ltd., Alteon 6420p XL Dual DC NEBS with extreme SSL.

In accordance with §2.955(a) (3), the following data is presented in support of the verification of the Radware Ltd., Alteon 6420p XL Dual DC NEBS with extreme SSL. Radware Ltd. should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the Alteon 6420p XL Dual DC NEBS with extreme SSL has been **permanently** discontinued, as per §2.955(b).

The results obtained relate only to the item(s) tested.

Model(s) Tested:	Alteon 6420p XL Dual DC NEBS with extreme SSL
Model(s) Covered:	RODS-HTQ-A4-NEBS ,RODS-HTQS-X-NEBS, Alteon 6420 NEBS, Alteon 6420 XL NEBS ,RODS-HTQ-A-NEBS, RODS-HTQ-XL-NEBS, Alteon 6420 Dual DC NEBS, Alteon 6420p XL Dual DC NEBS , Alteon 6420p Dual DC NEBS, Alteon 6420 XL Dual DC NEBS , OnDemand Switch HTQp NEBS , ODS-HTQp NEBS , OnDemand Switch HTQ NEBS , ODS-HTQ NEBS , Alteon 6420p XL NEBS , Alteon 6420 XL NEBS , Alteon 6420p NEBS , Alteon 6420 NEBS , 193103YX (where X=0 up to 9 ,Y=0 or 1)
Primary Power as Tested:	-48 V DC
Equipment Emissions Class:	B
Highest Clock Frequency:	2.5 GHz
Evaluated by:	Darrell Robinson
Report Date:	June 10, 2014

Table 2. EUT Overview

2.2 Test Site

All testing was performed at MET Laboratories, Inc., 914 W. Patapsco Ave., Baltimore, MD 21230. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

MET Laboratories is a ISO/IEC 17025 accredited site by A2LA: Baltimore #0591.01

Radiated Emissions measurements were performed in a semi-anechoic chamber. In accordance with §2.948(a)(3), a complete site description is contained at MET Laboratories.

2.3 Description of Test Sample

The Alteon 6420p XL Dual DC NEBS with extreme SSL, Equipment Under Test (EUT), is a carrier-grade ADC providing superior performance coupled with advanced capabilities such as ADC virtualization, integrated application acceleration and on demand scalability that are needed to effectively meet mobile carrier and large enterprise data center and network needs. A high-speed Layer 4-7 proxy, the Alteon 6420 performs as an application Provider-Edge (Application-PE), providing up to 80Gbps of application delivery capacity in a slim 2U form factor, with up to 24 virtual ADC instances and a load of 40GE and 10GE ports, for unparalleled scalability, availability, agility and performance.

2.4 Equipment Configuration

The EUT was set up as outlined in Figure 1. All equipment incorporated as part of the EUT is included in the following list.

Ref. ID	Slot #	Name / Description	Model Number	Part Number	Serial Number	Rev. #
1	--	Alteon 6420p XL - 80G/ODS-HTQp XL/64GB/DUAL DC/NEBS/RoHS	RODS-HTQ-XL-NEBS	19310307	31906492	C.11
2	--	PCB Assy. Bypass card for ODS-HTQ	ODS-HTQ-BP	20Q000ODS06X1	120200389	A.01
3	--	Motherboard	RODS-HTQ-MB-A	20Q000ODS08X1	1301000321	C.11
4	--	SATA DOM 16GB	APSDM016G85AN-AC	73S8016G01X00	881252405164	N/A
5	1	SSL board Assy.	CNN3550-C20-NHB-2.0-G	910123	4.0G1244-ICM000547	2.0
6	2	SSL board Assy.	CNN3550-C20-NHB-2.0-G	910123	4.0G1244-ICM000544	2.0
7	**3**	SSL board Assy.	CNN3550-C20-NHB-2.0-G	910123	4.0G1244-ICM000590	2.0

Table 3. Equipment Configuration, 1

Ref. ID	Slot #	Name / Description	Model Number	Part Number	Serial Number	Rev. #
1	--	Alteon 6420p XL - 80G/ODS-HTQp XL/64GB/DUAL DC/NEBS/RoHS	RODS-HTQ-XL-NEBS	19310307	31301693	C.11
2	--	PCB Assy. Bypass card for ODS-HTQ	ODS-HTQ-BP	20Q000ODS06X1	1211001797	A.01
3	--	Motherboard	RODS-HTQ-MB-A	20Q000ODS08X1	1301000327	C.11
4	--	SATA DOM 16GB	APSDM016G85AN-AC	73S8016G01X00	881252405163	N/A
5	1	SSL board Assy.	CNN3550-C20-NHB-2.0-G	910123	4.0G1244-ICM000550	2.0
6	2	SSL board Assy.	CNN3550-C20-NHB-2.0-G	910123	4.0G1244-ICM000344	2.0
7	**3**	SSL board Assy.	CNN3550-C20-NHB-2.0-G	910123	4.0G1244-ICM000349	2.0

Table 4. Equipment Configuration, 2

Ref. ID	Slot #	Name / Description	Model Number	Part Number	Serial Number	Rev. #
1	--	Alteon 6420p XL - 80G/ODS-HTQp XL/64GB/DUAL DC/NEBS/RoHS	RODS-HTQ-XL-NEBS	19310307	31301689	C.11
2	--	PCB Assy. Bypass card for ODS-HTQ	ODS-HTQ-BP	20Q000ODS06X1	1211001795	A.01
3	--	Motherboard	RODS-HTQ-MB-A	20Q000ODS08X1	1301000328	C.11
4	--	SATA DOM 16GB	APSDM016G85AN-AC	73S8016G01X00	881252405167	N/A
5	1	SSL board Assy.	CNN3550-C20-NHB-2.0-G	910123	4.0G1342-ICM002753	2.0
6	2	SSL board Assy.	CNN3550-C20-NHB-2.0-G	910123	4.0G1244-ICM000549	2.0
7	**3**	SSL board Assy.	CNN3550-C20-NHB-2.0-G	910123	4.0G1244-ICM000347	2.0

Table 5. Equipment Configuration, 3

Ref. ID	Slot #	Name / Description	Model Number	Part Number	Serial Number	Rev. #
1	--	Alteon 6420p XL - 80G/ODS-HTQp XL/64GB/DUAL DC/NEBS/RoHS	RODS-HTQ-XL-NEBS	19310307	31205055	C.11
2	--	PCB Assy. Bypass card for ODS-HTQ	ODS-HTQ-BP	20Q000ODS06X1	1205002478	A.01
3	--	Motherboard	RODS-HTQ-MB-A	20Q000ODS08X1	120500001	C.11
4	--	SATA DOM 16GB	APSDM016G85AN-AC	73S8016G01X00	881201300010	N/A
5	1	SSL board Assy.	CNN3550-C20-NHB-2.0-G	910123	4.0G1342-ICM003156	2.0
6	2	SSL board Assy.	CNN3550-C20-NHB-2.0-G	910123	N/A	2.0
7	**3**	SSL board Assy.	CNN3550-C20-NHB-2.0-G	910123	4.0G1342-ICM002760	2.0

Table 6. Equipment Configuration, 4

Ref. ID	Slot #	Name / Description	Model Number	Part Number	Serial Number	Rev. #
1	--	Alteon 6420p XL - 80G/ODS-HTQp XL/64GB/DUAL DC/NEBS/RoHS	RODS-HTQ-XL-NEBS	19310307	31205056	C.11
2	--	PCB Assy. Bypass card for ODS-HTQ	ODS-HTQ-BP	20Q000ODS06X1	1211001828	A.01
3	--	Motherboard	RODS-HTQ-MB-A	20Q000ODS08X1	1212000011	C.11
4	--	SATA DOM 16GB	APSDM016G85AN-AC	73S8016G01X00	881240501656	N/A
5	1	SSL board Assy.	CNN3550-C20-NHB-2.0-G	910123	4.0G1342-ICM003191	2.0
6	2	SSL board Assy.	CNN3550-C20-NHB-2.0-G	910123	4.0G1244-ICM000257	2.0
7	**3**	SSL board Assy.	CNN3550-C20-NHB-2.0-G	910123	4.0G1342-ICM002756	2.0

Table 7. Equipment Configuration, 5

2.5 Support Equipment

Support equipment necessary for the operation and testing of the EUT is included in the following list.

Ref. ID	Name / Description	Manufacturer	Model Number
A	Laptop	ACER	Travelmate 340T
B	Laptop	IBM	T42
C	Laptop	IBM	T43

Table 8. Support Equipment

2.6 Ports and Cabling Information

Ref. ID	Port Name on EUT	Cable Description	Qty.	Length (m)	Max Length (m)	Shielded (Y/N)	Termination Point
1	5, 7, 9, 11, 13, 15, 17, 19, 21, 23	RJ-45 (CAT 5e) or LC/UPC-LC/UPC Duplex (Tx-Rx) MM 50/125um 2mm	10	7.6m	10m (or 100m for FO)	Y	6, 8, 10, 12, 14, 16, 18, 20, 22, 24
2	MNG1	RJ-45 (CAT 5e)	1	7.6	10m	Y	MNG2
3	1, 3	MTP MM 12P-MTP MM 12P	2	2m	100m	N	2, 4
4	Port # : "CONSOLE"	DB9/Male to RJ-45 Male	1	10m	10m	Y	Laptop COM1 port
5	PWR1	2 conductor, 12 AWG	2	7.6	10m	N	DC Power Supply
6	PWR2	2 conductor, 12 AWG	2	7.6	10m	N	DC Power Supply
7	GND	2 conductor, 12 AWG	2	7.6	10m	N	Ground

Table 9. Ports and Cabling Information

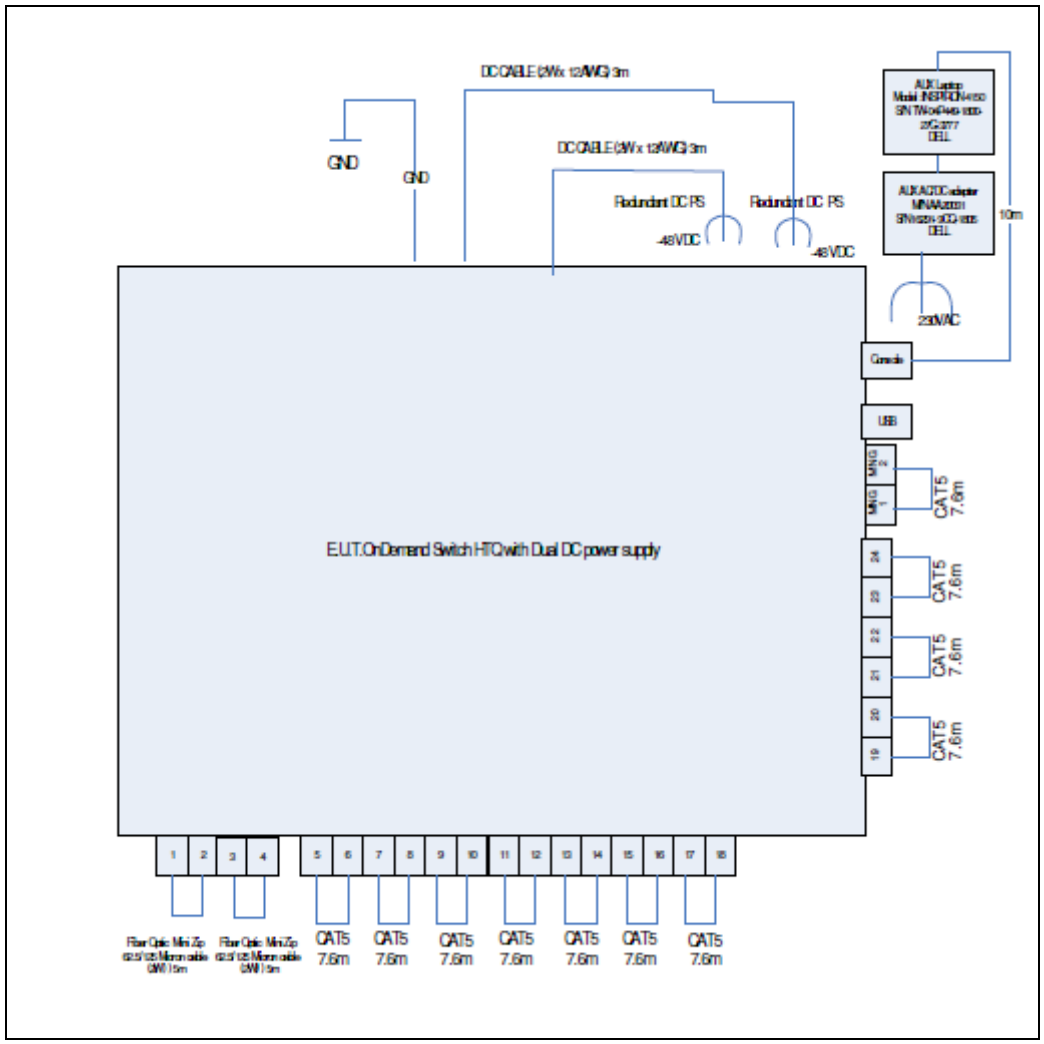


Figure 1. Block Diagram of Test Configuration

2.7 Mode of Operation

The Alteon 6420p XL is using Network Diagnostic software (based on Alteon application software) that transfers & receives data packets to/from all data ports. The EUT will monitor data traffic generated from all of the copper and fiber ports which are looped back in a daisy chain and analyzed by the software for successful receipt of all data packets.

2.8 Method of Monitoring EUT Operation

An external laptop with *ProComm Plus* application, will continuously monitor the operation of the EUT. Connection between the laptop & the EUT is done with RS-232 cable.The test time is 1 minute long (this time can be changed if needed) and the # of test cycles defined is 240000 thus total operation & monitoring time is for more
than 7 continuous working days.
At the end of every test cycle , the Network Diagnostic software sends test results which can be monitored on the laptop's screen. The following prints are shown once completed data transfer & analysis successfully at each test cycle:

INTERMEDIATE DIAGNOSTIC For port 1 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 2 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 3 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 4 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 5 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 6 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 7 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 8 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 9 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 10 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 11 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 12 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 13 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 14 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 15 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 16 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 17 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 18 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 19 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 20 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 21 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 22 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 23 Test is PASSED
INTERMEDIATE DIAGNOSTIC For port 24 Test is PASSED
INTERMEDIATE DIAGNOSTIC For MNG1 Test is PASSED
INTERMEDIATE DIAGNOSTIC For MNG2 Test is PASSED

2.9 Modifications

2.9.1 Modifications to the EUT

No modifications were made to the EUT.

2.9.2 Modifications to the Test Standard

No modifications were made to the test standard.

2.10 Disposition of EUT

The test sample including all support equipment (if any), submitted to the Electro-Magnetic Compatibility Lab for testing was returned to Radware Ltd. upon completion of testing.

2.11 Test Software Used

Baltimore:
Conducted Emissions - Trace Data Grabber version 11/24/08
Radiated Emissions- EMC-REG-TDS-11, Radiated Emissions Prescan.xls version 06/29/11

3.0 Electromagnetic Compatibility Emission Criteria

3.1 Conducted Emission Limits

Test Requirement(s): **15.107 (a)** "Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in Table 10. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals."

15.107 (b) "For a Class A digital device that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in Table 10. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals. The lower limit applies at the band edges."

Frequency range (MHz)	15.107(b), Class A Limits (dBμV)		15.107(a), Class B Limits (dBμV)	
	Quasi-Peak	Average	Quasi-Peak	Average
0.15- 0.5	79	66	66 - 56	56 - 46
0.5 – 5.0	73	60	56	46
5.0 - 30	73	60	60	50
Note 1 — The lower limit shall apply at the transition frequencies.				
Note 2 — The limit decreases linearly with the logarithm if the frequency in the range 0.15 MHz to 0.5 MHz.				

Table 10. Conducted Limits for Radio Frequency Devices calculated from FCC Part 15 Section 15.107(a) (b)

Test Results: The EUT was not applicable with the Class B requirement(s) of this section. The EUT is DC powered.

Radiated Emission Limits

Test Requirement(s):

15.109 (a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the Class B limits expressed in Table 11.

15.109 (b) The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the Class A limits expressed in Table 11.

Frequency (MHz)	Field Strength (dBµV/m)	
	§15.109 (b), Class A Limit (dBµV) @ 10m	§15.109 (a),Class B Limit (dBµV) @ 3m
30 - 88	39.00	40.00
88 - 216	43.50	43.50
216 - 960	46.40	46.00
Above 960	49.50	54.00

Table 11. Radiated Emissions Limits calculated from FCC Part 15, §15.109 (a) (b)

Test Procedures:

The EUT was located on a turntable inside a semi-anechoic chamber. The EUT was isolated from the ground plane by up to 12 mm with thin insulating material. The method of testing and test conditions of ANSI C63.4:2003 were used. For emissions between 30 and 1000 MHz, a broadband antenna was located 3 m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1 m and 4 m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. Unless otherwise specified, measurements were made using a quasi-peak detector with a 120 kHz resolution bandwidth.

For emission between 1 GHz and 18 GHz, a double ridged guide horn was located 1 m from the EUT on an adjustable mast. A pre-scan was performed and used to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied depending on the geometry of the EUT. In order to ensure maximized emissions, the horn antenna was positioned both vertically and laterally. Measurements in both horizontal and vertical polarities were made and the data was recorded. Unless otherwise specified, measurements were made using an average detector with a 1 MHz resolution bandwidth.

For emission between 18 GHz and 40 GHz, an external harmonic mixer with a high frequency standard gain horn antenna was used. The horn antenna was located in the far field, but closes enough to the EUT so that the resulting measurement had a noise floor lower than the applicable limit. A pre-scan was performed and used to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied depending on the geometry of the EUT. In order to

ensure maximized emissions, the horn antenna was positioned both vertically and laterally. In the event that the mixer cable length does not allow for total EUT coverage by the horn, the entire measurement system shall be raised and lowered as necessary. Measurements in both horizontal and vertical polarities were made and the data was recorded. Unless otherwise specified, measurements were made using an average detector with a 1 MHz resolution bandwidth.

Emissions measured at a distance other than the published distance were normalized using an inverse proportionality factor of 20dB per decade for comparison to the 3 m limit.

Test Results: The EUT was compliant with the Class B requirement(s) of this section. Measured emissions were below applicable limits.

Test Engineer(s): Darrell Robinson

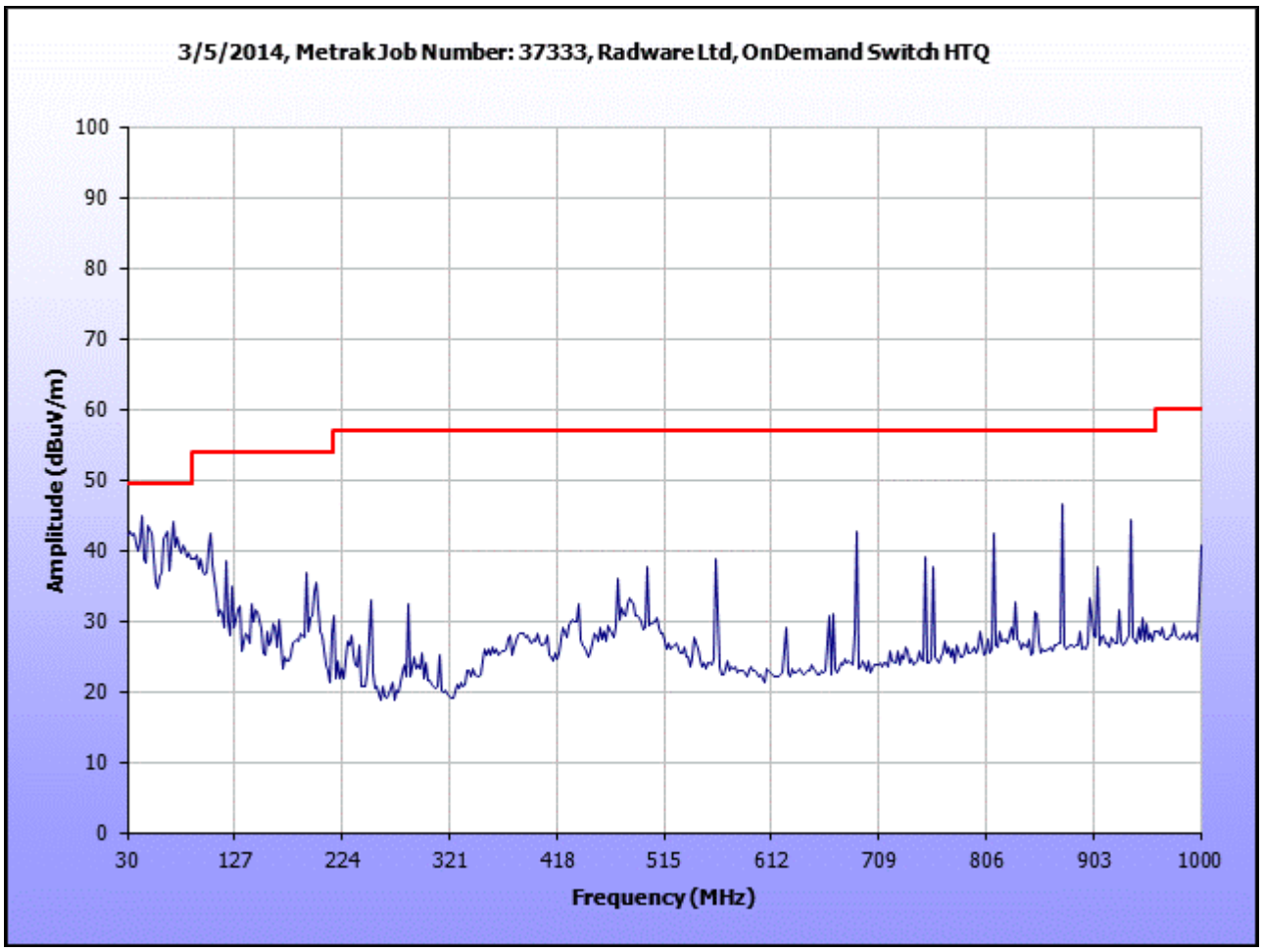
Test Date(s): 03/10/2014 – 03/19/2014

Radiated Emissions Limits Test Results, Class B

Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna HEIGHT (m)	Uncorrected Amplitude (dBuV/m)	Antenna Correction Factor (dB) (+)	Cable Loss (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
50.597695	21	H	1.70	14.39	8.52	0.75	10.46	13.20	39.00	-25.80
50.597695	266	V	1.00	28.04	8.52	0.75	10.46	26.85	39.00	-12.15
95.988728	178	H	1.32	29.91	9.20	1.08	10.46	29.73	43.50	-13.77
95.988728	223	V	1.00	24.76	9.20	1.08	10.46	24.58	43.50	-18.92
562.47771	361	H	1.17	18.24	18.90	2.31	10.46	28.99	46.40	-17.41
562.47771	171	V	1.00	17.10	18.90	2.31	10.46	27.85	46.40	-18.55
687.47445	230	H	1.00	18.60	20.70	2.58	10.46	31.42	46.40	-14.98
687.47445	41	V	1.00	19.70	20.70	2.58	10.46	32.52	46.40	-13.88
812.4732	154	H	1.00	20.35	22.25	2.71	10.46	34.85	46.40	-11.55
812.4732	332	V	1.27	18.88	22.25	2.71	10.46	33.38	46.40	-13.02
874.95932	341	H	1.00	19.58	22.60	2.77	10.46	34.49	46.40	-11.91
874.95932	310	V	1.03	16.71	22.60	2.77	10.46	31.62	46.40	-14.78

Table 12. Radiated Emissions Limits, Test Results

Note: The following sample calculation was used to correct the amplitude (Corrected Amplitude (dBuV/m)= Uncorrected Data+ACF+Cable Loss-Distance Correction Factor).



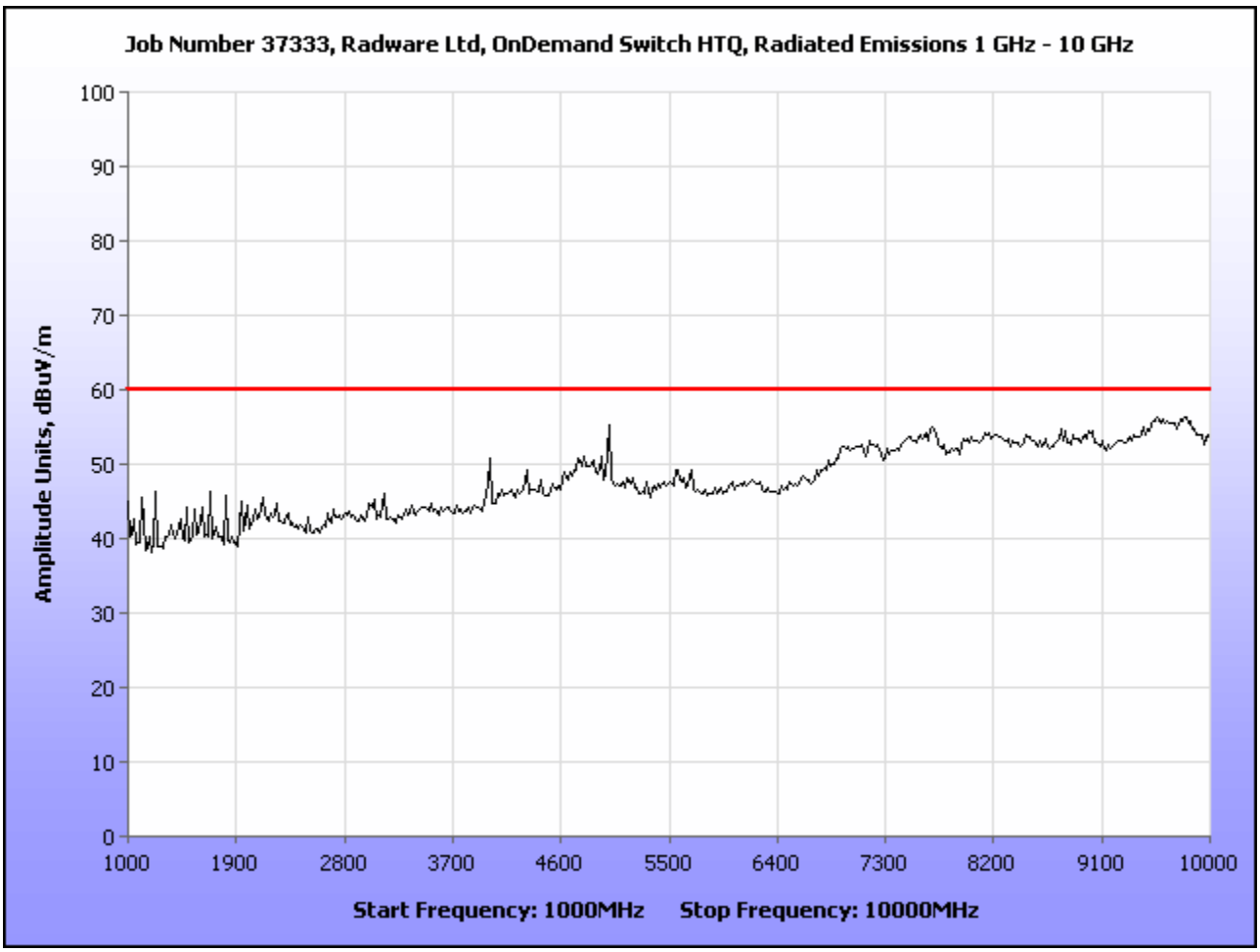
Plot 1. Radiated Emissions, Prescan

Radiated Emissions Limits Test Results, 1 GHz to 10 GHz, Class B

Frequency (GHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna HEIGHT (m)	Uncorrected Amplitude (dBuV/m)	Antenna Correction Factor (dB) (+)	Cable Loss (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	44.9	H	1.00	44.45	-1.00	3.08	9.54	36.99	54.00	-17.01
1	354.2	V	1.18	45.71	-0.84	3.08	9.54	38.41	54.00	-15.59
5.0035	234.6	H	1.00	35.41	8.19	6.89	9.54	40.95	54.00	-13.05
5.0035	33	V	1.25	42.16	8.17	6.89	9.54	47.68	54.00	-6.32
7.4544	1.4	H	1.12	27.63	12.32	12.06	9.54	42.47	54.00	-11.53
7.4544	323.9	V	1.00	27.59	12.32	12.06	9.54	42.43	54.00	-11.57
9.7893	328.7	H	1.10	26.44	12.40	10.73	9.54	40.03	54.00	-13.97
9.7893	34.4	V	1.00	26.60	12.30	10.73	9.54	40.09	54.00	-13.91

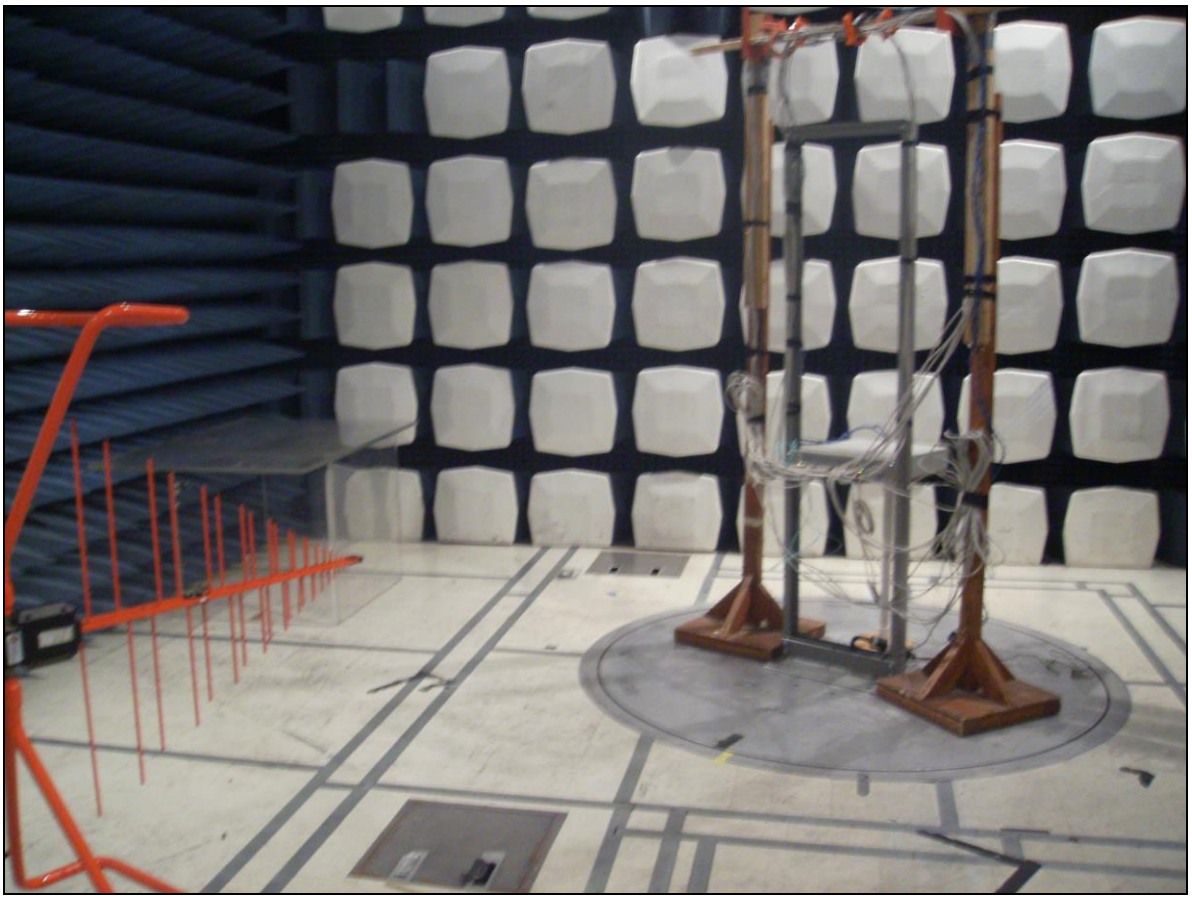
Table 13. Radiated Emissions Limits, Test Results, 1 GHz to 10 GHz

Note: The following sample calculation was used to correct the amplitude (Corrected Amplitude (dBuV/m)= Uncorrected Data+ACF+Cable Loss-Distance Correction Factor).



Plot 2. Radiated Emissions, 1 GHz to 10 GHz

Radiated Emission Limits Test Setup



Photograph 1. Radiated Emission Limits, Test Setup

4.0 Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2005.

TEST NAME: **RADIATED EMISSIONS**			TEST DATE(S): **5/10/2014 – 5/19/2014**		
MET ASSET #	**NOMENCLATURE**	**MANUFACTURER**	**MODEL**	**LAST CAL DATE**	**CAL DUE DATE**
1T4300A	SEMI-ANECHOIC CHAMBER # 1 (FCC)	EMC TEST SYSTEMS	NONE	07/24/2012	07/24/2015
1T4576	ANTENNA, ACTIVE HORN	COM-POWER	AHA-118	09/05/2013	03/05/2015
1T4751	ANTENNA - BILOG	SUNOL SCIENCES	JB6	01/08/2013	07/08/2014
1T4409	EMI RECEIVER	ROHDE & SCHWARZ	ESIB7	07/16/2012	07/16/2014
1T4842	SPECTRUM ANALYZER	RHODE & SCHWARZ	FSP-30	01/14/2014	01/14/2015

Table 14. Test Equipment

5.0 Compliance Information

5.1 Verification Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart I — Marketing of Radio frequency devices:

§ 2.801 Radio-frequency device defined.

As used in this part, a radio-frequency device is any device which in its operation is capable of Emitting radio-frequency energy by radiation, conduction, or other means. Radio- frequency devices include, but are not limited to:

(a) The various types of radio communication transmitting devices described throughout this chapter.

(b) The incidental, unintentional and intentional radiators defined in Part 15 of this chapter.

(c) The industrial, scientific, and medical equipment described in Part 18 of this chapter.

(d) Any part or component thereof which in use emits radio-frequency energy by radiation, conduction, or other means.

§ 2.803 Marketing of radio frequency devices prior to equipment authorization.

(a) Except as provided elsewhere in this chapter, no person shall sell or lease, or offer for sale or lease (including advertising for sale or lease), or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any radio frequency device unless:

(1) In the case of a device subject to certification, such device has been authorized by the Commission in accordance with the rules in this chapter and is properly identified and labeled as required by §2.925 and other relevant sections in this chapter; or

(2) In the case of a device that is not required to have a grant of equipment authorization issued by the Commission, but which must comply with the specified technical standards prior to use, such device also complies with all applicable administrative (including verification of the equipment or authorization under a Declaration of Conformity, where required), technical, labeling and identification requirements specified in this chapter.

(d) Notwithstanding the provisions of paragraph (a) of this section, the offer for sale solely to business, commercial, industrial, scientific or medical users (but not an offer for sale to other parties or to end users located in a residential environment) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements *provided* that the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution.

(e)(1) Notwithstanding the provisions of paragraph (a) of this section, prior to equipment authorization or determination of compliance with the applicable technical requirements any radio frequency device may be operated, but not marketed, for the following purposes and under the following conditions:

(i) Compliance testing;

(ii) Demonstrations at a trade show provided the notice contained in paragraph (c) of this section is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iii) Demonstrations at an exhibition conducted at a business, commercial, industrial, scientific or medical location, but excluding locations in a residential environment, provided the notice contained in paragraphs (c) or (d) of this section, as appropriate, is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iv) Evaluation of product performance and determination of customer acceptability, provided such operation takes place at the manufacturer's facilities during developmental, design or pre-production states; or

(v) Evaluation of product performance and determination of customer acceptability where customer acceptability of a radio frequency device cannot be determined at the manufacturer's facilities because of size or unique capability of the device, provided the device is operated at a business, commercial, industrial, scientific or medical user's site, but not at a residential site, during the development, design or pre-production stages.

(e)(2) For the purpose of paragraphs (e)(1)(iv) and (e)(1)(v) of this section, the term *manufacturer's facilities* includes the facilities of the party responsible for compliance with the regulations and the manufacturer’s premises, as well as the facilities of other entities working under the authorization of the responsible party in connection with the development and manufacture, but not the marketing, of the equipment.

(f) For radio frequency devices subject to verification and sold solely to business, commercial, industrial, scientific and medical users (excluding products sold to other parties or for operation in a residential environment), parties responsible for verification of the devices shall have the option of ensuring compliance with the applicable technical specifications of this chapter at each end user's location after installation, provided that the purchase or lease agreement includes a provision that such a determination of compliance be made and is the responsibility of the party responsible for verification of the equipment.

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart J — Equipment Authorization Procedures:

§ 2.901 Basis and Purpose

(a) In order to carry out its responsibilities under the Communications Act and the various treaties and international regulations, and in order to promote efficient use of the radio spectrum, the Commission has developed technical standards for radio frequency equipment and parts or components thereof. The technical standards applicable to individual types of equipment are found in that part of the rules governing the service wherein the equipment is to be operated.[1] *In addition to the technical standards provided, the rules governing the service may require that such equipment be verified by the manufacturer or importer*, be authorized under a Declaration of Conformity, or receive an equipment authorization from the Commission by one of the following procedures: certification or registration.

(b) The following sections describe the verification procedure, the procedure for a Declaration of Conformity, and the procedures to be followed in obtaining certification from the Commission and the conditions attendant to such a grant.

§ 2.902 Verification.

(a) *Verification is a procedure where the manufacturer*[2] makes measurements or *takes the necessary steps to insure that the equipment complies with the appropriate technical standards.* Submission of a sample unit or representative data to the Commission demonstrating compliance is not required unless specifically requested by the Commission pursuant to § 2.957, of this part.

(b) Verification attaches to all items subsequently marketed by the manufacturer or importer which are identical as defined in § 2.908 to the sample tested and found acceptable by the manufacturer.

[1] In this case, the equipment is subject to the rules of Part 15. More specifically, the equipment falls under Subpart B (of Part 15), which deals with unintentional radiators.

[2] In this case, MET Laboratories, Inc. is acting as an agent of the manufacturer.

§ 2.948 Description of measurement facilities.

(a) Each party making measurements of equipment that is subject to an equipment authorization under Part 15 or Part 18 of this chapter, regardless of whether the measurements are filed with the Commission or kept on file by the party responsible for compliance of equipment marketed within the U.S. or its possessions, shall compile a description of the measurement facilities employed.

(1) If the measured equipment is subject to the verification procedure, the description of the measurement facilities shall be retained by the party responsible for verification of the equipment.

(i) If the equipment is verified through measurements performed by an independent laboratory, it is acceptable for the party responsible for verification of the equipment to rely upon the description of the measurement facilities retained by or placed on file with the Commission by that laboratory. In this situation, the party responsible for the verification of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.

(ii) If the equipment is verified based on measurements performed at the installation site of the equipment, no specific site calibration data is required. It is acceptable to retain the description of the measurement facilities at the site at which the measurements were performed.

(2) If the equipment is to be authorized by the Commission under the certification procedure, the description of the measurement facilities shall be filed with the Commission's Laboratory in Columbia, Maryland. The data describing the measurement facilities need only be filed once but must be updated as changes are made to the measurement facilities or as otherwise described in this section. At least every three years, the organization responsible for filing the data with the Commission shall certify that the data on file is current.

§ 2.952 Limitation on verification.

(a) Verification signifies that the manufacturer or importer has determined that the equipment has been shown to be capable of compliance with the applicable technical standards if no unauthorized change is made in the equipment and if the equipment is properly maintained and operated. Compliance with these standards shall not be construed to be a finding by the manufacturer or importer with respect to matters not encompassed by the Commission's rules.

(b) Verification of the equipment by the manufacturer or importer is effective until a termination date is otherwise established by the Commission.

(c) No person shall, in any advertising matter, brochure, etc., use or make reference to a verification in a deceptive or misleading manner or convey the impression that such verification reflects more than a determination by the manufacturer or importer that the device or product has been shown to be capable of compliance with the applicable technical standards of the Commission's rules.

§ 2.953 Responsibility for compliance.

(a) In verifying compliance, the responsible party, as defined in §2.909 warrants that each unit of equipment marketed under the verification procedure will be identical to the unit tested and found acceptable with the standards and that the records maintained by the responsible party continue to reflect the equipment being produced under such verification within the variation that can be expected due to quantity production and testing on a statistical basis.

(b) The importer of equipment subject to verification may upon receiving a written statement from the manufacturer that the equipment complies with the appropriate technical standards rely on the manufacturer or independent testing agency to verify compliance. The test records required by §2.955 however should be in the English language and made available to the Commission upon a reasonable request, in accordance with §2.956.

(c) In the case of transfer of control of equipment, as in the case of sale or merger of the grantee, the new manufacturer or importer shall bear the responsibility of continued compliance of the equipment.

(d) Verified equipment shall be re-verified if any modification or change adversely affects the emanation characteristics of the modified equipment. The party designated in §2.909 bears responsibility for continued compliance of subsequently produced equipment.

§ 2.954 Identification.

Devices subject only to verification shall be uniquely identified by the person responsible for marketing or importing the equipment within the United States. However, the identification shall not be of a format which could be confused with the FCC Identifier required on certified, notified or type accepted equipment. The importer or manufacturer shall maintain adequate identification records to facilitate positive identification for each verified device.

§ 2.955 Retention of records.

(a) For each equipment subject to verification, the responsible party, as shown in §2.909 shall maintain the records listed as follows:

(1) A record of the original design drawings and specifications and all changes that have been made that may affect compliance with the requirements of §2.953.

(2) A record of the procedures used for production inspection and testing (if tests were performed) to insure the conformance required by §2.953. (Statistical production line Emission testing is not required.)

(b) The records listed in paragraph (a) of this section shall be retained for two years after the manufacture of said equipment item has been permanently discontinued, or until the conclusion of an investigation or a proceeding if the manufacturer or importer is officially notified that an investigation or any other administrative proceeding involving his equipment has been instituted.

§ 2.956 FCC inspection and submission of equipment for testing.

(a) Each responsible party shall upon receipt of reasonable request:

(1) Submit to the Commission the records required by §2.955.

(2) Submit one or more sample units for measurements at the Commission's Laboratory.

(i) Shipping costs to the Commission's Laboratory and return shall be borne by the responsible party.

(ii) In the event the responsible party believes that shipment of the sample to the Commission's Laboratory is impractical because of the size or weight of the equipment, or the power requirement or for any other reason, the responsible party may submit a written explanation why such shipment is impractical and should not be required.

Label and User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart A — General:

§ 15.19 Labeling requirements.

(a) In addition to the requirements in Part 2 of this chapter, a device subject to certification or verification shall be labeled as follows:

(1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under Part 73 of this chapter, land mobile operation under Part 90, etc., shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

(2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

This device is verified to comply with Part 15 of the FCC Rules for use with cable television service.

(3) All other devices shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

(4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.

(5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

§ 15.21 Information to user.

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart B — Unintentional Radiators:

§ 15.105 Information to the user.

(a) For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expense.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/ TV technician for help.

